motion of the mask and substrate, residual ripple effect can be reduced (e.g. with the factor of 10).

[0063] The graded layer thickness can be obtained with the mask to be used according to the invention by means of a respective variation of the ratio of free cross-sections of the perforations being discretely provided in the mask, and the intermediate web surfaces per unit of area. Such graded layer thicknesses can be present over the total surface, on areas of the mask as well to form equivalent gradients of layer thicknesses on the total surface, or merely on areas of the surface to be coated. Gradients of layer thicknesses can also be obtained alone or in addition to the previously described way by means of a corresponding variation of the distance between the surface of the substrate and the mask. Thus, for example, the mask can be obliquely aligned at an inclined angle toward the substrate surface, or an obliquely inclined substrate surface can be used with a mask aligned orthogonally to the respective flow rate of particles. The mask can be curved completely or merely in areas in a concave and convex manner, respectively.

[0064] As a rule, it will be advantageous to form the perforations being discretely arranged within the mask with identical free cross-sections and identical cross-sectional geometries as well. The free cross-sections of the perforations are allowed to be formed in a circular, hexagonal, octagonal or even elliptical manner. With hexagonal or octagonal cross-sectional shapes of the perforations it is possible that unequal edge lengths have been formed in order to obtain elongated free cross-sections of the perforations such as with elliptical shapes as well. In particular, this is favorable if the mask to be used has been aligned at an obliquely inclined angle or with a curved formation with respect to the respective substrate surface. Thus, the respective angle of inclination at the corresponding perforation may be compensated for the passage of the flow rate of particles.

[0065] Frequently, it may be favorable to continuously provide the variation of the ratio of the free cross-sections of the perforations with the intermediate web surfaces per unit of area along an axis. The perforations can be formed in a column and line, arrangement within the mask. In this case it is also suitable for the perforations to be staggered to each other in adjacent lines or columns. It is also possible for this ratio to be varied from the inside radially toward

outwards, for example, originating from the centre or centre of gravity of the surface of the mask. However, the ratio of the free cross-section surfaces and of the intermediate web surfaces per unit of area can also be varied under consideration of a substrate surface being aligned at an obliquely inclined angle or curved, thus considering the different distances between the mask and substrate surface.

[0066] The translatory oscillatory motion between the mask and substrate should preferably be performed in parallel with the alignment of the respective lines and/or columns of perforations. The path traveled between the inversion points during such an oscillatory motion may correspond to the central distance of centers or centers of gravity of the surface of the perforations of a mask. The same dimensioning can also be selected for the diameter of the circular path motions which carry out the individual perforations of the mask.

[0067] The flow rate of particles used for coating can be generated in vacuum with CVD methods or else P2VD methods known per se. Thus, for example, the electro-beam evaporation, the PLD method and ion-supported methods can be employed. Magnetron sputtering has become apparent as suitable to obtain relatively large-area and homogenous coatings, in particular. Successively, multilayer systems can be formed with several sources of particle flow rates in a common vacuum chamber.

[0068] In addition to the relative motion to be employed between the mask and substrate it is also advantageous to additionally move the substrate and mask together with respect to the plasma source and / or a target which in turn can be advantageously obtained through a common rotation about an axis of rotation. For a relative motion of the mask and substrate the most different propulsion concepts can be used. Thus, it is possible to use conventional mechanical drives including gears and without additional gears which can also be combined with the drive for the common motion of the substrate and mask.

[0069] However, in particular for an oscillatory translatory relative motion, it may be advantageous to use at least one piezo actuator which implements the oscillatory motion including a suitable path between the inversion points by means of a lever system, as the case may be.

[0070] With the invention, it is possible to form almost any gradients of layer thickness, and however locally limited gradients of layer thickness in the individual layers or multilayer systems on substrate surfaces. Layer thicknesses within the range of ≥0.2 up to 1 μm area are allowed to be implemented. The achievable residual ripple is so small such that interference's with reflections of X-radiation can be avoided. Most differently formed substrate surfaces are allowed to be coated in a graded form wherein variations of layer thickness in different axial alignments can be further obtained.